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ABSTRACT	

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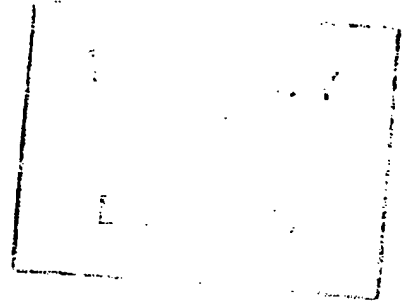
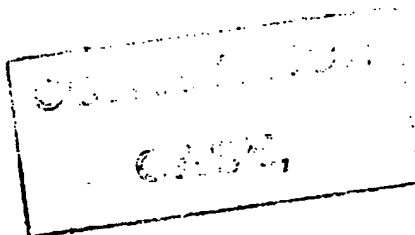
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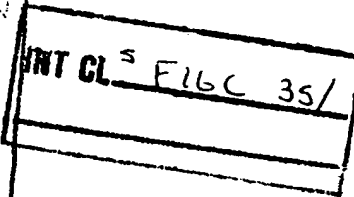
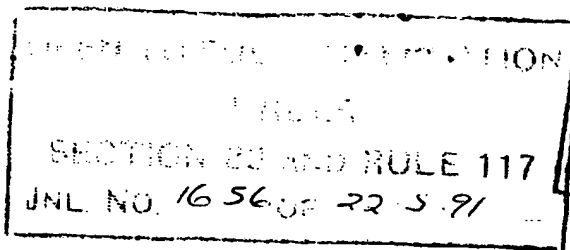
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PATENTS ACT 1964

COMPLETE SPECIFICATION



"A METHOD FOR MOUNTING SHAFT BEARINGS, IN  
PARTICULAR FOR CODERS, A DEVICE FOR EFFECTING  
THIS METHOD, AND CODERS THUS OBTAINED"



APPLICATION No. 4110/90

SPECIFICATION FILED 14/11/90

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A METHOD FOR MOUNTING SHAFT BEARINGS, IN PARTICULAR FOR CODERS, A  
DEVICE FOR EFFECTING THIS METHOD AND CODERS THUS OBTAINED.

5 The present invention relates to the field of mounting shafts and  
bearings, especially in bearing blocks and with prestressing, in  
particular shafts for coders, and the invention has for its subject a  
method for mounting shaft bearings, in particular for coders.

10 The invention also has for its subject a device for effecting this  
method and the coders thus obtained.

15 In the particular case of coding devices such as absolute or  
incremental coders, for sensing rotational speeds, numbers of  
rotations, accelerations and directions of rotations, the mounting of  
the coder shafts in their bearing block is generally carried out with  
variable prestressing depending on specific requirements.

20 At the present time, there exist for this purpose bearing devices  
in the form of a shaft provided with two bearing tracks, rings, rollers  
or parallel needle bearings working together with a cylinder.

25 Such devices, however, only allow limited adaptability of the  
shafts to requirements and thus less flexibility of application for  
utilizing specific shafts, each device being mass produced according to  
a given standard.

30 It is the same in relation to the prestressing exerted on the  
bearing blocks for the shafts, this prestressing remaining constant for  
a given type of manufacture and not being adaptable to a specific use.

There also exist simple bearing mountings which are glued by their  
inner rings to the shaft to be guided, a spacer being mounted between  
the outer rings.

35 In this embodiment, adjustment of the prestressing is carried  
out by means of wedges to which a strictly calibrated force is applied,  
this force being however, difficult to maintain constant.

It is an object of the present invention is to overcome these disadvantages.

5 It has, in effect, for its subject, a method for mounting shaft bearings, in particular for coders, characterised in that it consists essentially of gluing the shaft at the level of the mounting region for the first bearing, of fitting the said shaft into the inner ring of the said first bearing so as to butt against the base of a jig for supporting the said first bearing, of gluing the said shaft at the  
10 level of the mounting region for the second bearing, of placing it in a jig for mounting this latter, of putting an intermediary prestressing spring in place on this shaft, of fitting the second bearing onto the shaft, of bringing the said second bearing into its operating position by means of a press working with the jig, then of gluing, on the one  
15 hand, the base of the bearing block of the coder at the seating level of one of the bearings, and, on the other hand, the other bearing on its outer ring and, finally, of mounting the shaft with its bearings in the said bearing block.

20 The invention also has for its subject a device for effecting the method described above, characterised in that it is essentially formed by a station for gluing the shaft, the bearings and the bearing block of the coder, by a first jig for mounting the first bearing and by an assembly of jigs and presses for mounting with prestressing the second  
25 bearing.

30 Finally, the invention also has for its subject a coder provided with a shaft mounted with prestress in its bearing block by means of bearings.

35 The invention will be better understood by virtue of the following description, which relates to a preferred embodiment, given by way of non-limiting example, and explained with reference to the accompanying schematic drawings, in which

Figure 1 is a sectional view of a coder obtained by effecting the method according to the invention;

Figure 2 is a plan view of the device for effecting the method according to the invention, and

5        Figure 3 is a sectional view, to a larger scale, of a jig and press assembly of the device according to Figure 2.

10        According to the invention and as shown more precisely, by way of example, in Figures 1 to 3 of the accompanying drawings, the method of mounting the bearings 1 of shafts 2, in particular for coders, consists essentially of gluing the shaft 2 at the level of the mounting region for the first bearing 1, of fitting the said shaft 2 into the inner ring of the said first bearing 1 sufficiently far for it to butt against the base of a jig 3 for supporting the said first bearing 1.

15        The shaft 2 is then glued at the level of the mounting region for the second bearing 1, then placed into a jig 4 for mounting this latter. Then, an intermediary prestressing spring 5 is put in place on the shaft 2, and the second bearing 1 is fitted onto the shaft 2. This second bearing 1 is brought to its operating position by means of a  
20        press 6 cooperating with the jig 4. The base of the bearing block 7 of the coder 8 (Figure 1) is then glued at the level at which one of the bearings 1 is seated, and the other bearing 1 is glued on its outer ring, and, finally, the shaft 2 with its bearings 1 is mounted in the said bearing block 7.

25        This embodiment permits mounting and gluing commercial bearings, by their inner ring, directly onto shafts which are plain except for their ends, which are formed as a function of their use in the coder. This bearing assembly is carried out with prestressing of an  
30        intermediary spring which engages against the outer cages of the bearings 1, the prestressing being brought about by means of the press 6 working together with the jig 4, after mounting the second bearing, the polymerisation of the adhesive leading to the relative position of the two bearings being definitively maintained.

35        The prestressing exercised by the spring 5 may be adjusted in advance by action on this latter, that is to say by an appropriate choice of the cross-section of the wire from which it is formed or of

the number of turns or yet again of its compression path.

5 Due to the provision of a jig 4 working together with the press 6, it suffices that this latter applies a force sufficient to compress the spring 5 until its surface of application, acting on the corresponding bearing 1 during mounting of this latter, comes to butt against the jig 4.

10 The mounting and gluing of the shaft 2 - bearings 1 assembly in the bearing block 7 of the coder 8 is carried out manually with butting of the bearing 1 which corresponds to the base of the bearing block 7 against the said base.

15 The invention also has for its subject a device for effecting the method described above characterised in that it essentially comprises a station 9 for gluing the shaft 2, the bearings 1 and the bearing block 7 of the coder 8, a first jig 3 for mounting the first bearing 1 and an assembly of jigs 4 and presses 6 for mounting with prestressing the second bearing 1.

20 The station 9 for gluing the shaft 2, the bearings 1 and the bearing block 7 of the coder 8 is advantageously formed by a drum 10 for mounting and driving the shaft 2 or the coder 8 by means of a chuck and by a pipette 11 for distribution of adhesive at the gluing regions  
25 connected to a reservoir for adhesive, rotational drive of the drum simultaneously initiating adhesive delivery and being activatable by a foot pedal.

30 The first jig 3 is formed by a hollow cylindrical member provided in its upper part with a shoulder 12 for support of the first bearing 1 and enabling seating of the shaft 2, the distance between the support surface of the shoulder 12 and the base of the cylindrical member being equal to the distance between the support surface of the bearing 1 and the opposite end of the shaft 2 (Figure 2).

35 Thus, after mounting the first bearing 1 on the shaft 2, it suffices to insert the said shaft 2, by its end opposite to the bearing 1, into the jig 3 and to bring the end of the shaft 2 to butt against

the base of the jig 3 and the bearing 1 to butt against the shoulder 12 of the said jig 3.

5 Each jig 4 working together with a press 6 is formed, as shown in Figure 3, by a hollow cylindrical member, which can be mounted in alignment with the shaft of the jack of the corresponding press 6 by interchangeably fitting it into a cylindrical hole 13 of the support 14 for the said press 6 and the said hollow element having a closed base 15 for support of the end of the shaft 2 and guiding the bearings 1 by  
10 their outer ring.

Each press 6 is formed by a jack, the head 16 of which is provided with a hollow cylindrical portion 17 adapted to be fitted onto the corresponding end of the shaft 2 on which the bearings 1 are to be  
15 mounted and for engaging against the upper bearing and with a cylindrical portion of greater diameter 18 offset with respect to the hollow portion 17 and adapted to engage against the upper support surface of the corresponding jig 4, the length of the offset between the support surfaces of the portions 17 and 18 corresponding to the  
20 path of driving of the portion 17 into the jig 4 which is necessary to bring about the prestressing of the spring 5.

Thus, after adjustment of this distance, the prestressing of the spring 5 is automatically obtained and the relative positioning of the  
25 bearings 1 is assured with absolutely perfect repetition from one shaft 2 to the other for the full duration of manufacture of a series of coders of the same type. In the case of a change in manufacture, it suffices to adapt the sizes of the jigs and of the portions 17 and 18 of the head 16 of each press 6 to the dimensions of the new series of  
30 shafts and the bearings which they carry.

Finally, the invention also has for a subject a coder 8 provided with a shaft mounted with prestressing in its bearing block by means of bearings 1 loaded by a spring 5 acting between their outer rings  
35 (Figure 1).

The coders 8 obtained by effecting the method according to the invention, by means of the device described above, may be perfectly



adapted to their specific use, the mounting of the shaft in the bearing block being perfectly adjustable to a predetermined constraint.

5        It will be understood that the invention is not limited to the  
embodiment described and depicted in the accompanying drawings.  
Modifications remain possible, in particular from the point of view of  
formation of the various members or by substitution of equivalent  
techniques without however departing from the field of protection of  
the invention.

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CLAIMS

1. A method for mounting shaft bearings, in particular for  
coders, characterised in that it consists essentially of gluing the  
5 shaft (2) at the level of the mounting region for the first bearing  
(1), of fitting the said shaft into the inner ring of the said first  
bearing so as to butt against the base of a jig (3) for supporting the  
said first bearing (1), of gluing the said shaft (2) at the level of  
the mounting region for the second bearing (1), of placing it into a  
10 jig (4) for mounting this latter, of putting an intermediary  
prestressing spring (5) in place on the shaft, of fitting the second  
bearing (1) onto the shaft (2), of bringing the said second bearing (1)  
into its operating position by means of a press (6) working together  
with the jig (4), then of gluing, on the one hand, the base of the  
15 bearing block (7) of the coder (8) at the seating level of one of the  
bearings (1), and, on the other hand, the other bearing (1) on its  
outer ring, and, finally, of mounting the shaft (2) with its bearings  
(1) in the said bearing block (7).

20 2. A method according to claim 1, characterised in that the  
mounting and gluing of the shaft (2) - bearings (1) assembly in the  
bearing block (7) of the coder (8) is carried out manually with butting  
of the bearing (1) corresponding to the base of the bearing block (7)  
against the said base.

25 3. A device for effecting the method according to either of  
claims 1 and 2, characterised in that it is essentially formed by a  
station (9) for gluing the shaft (2), the bearings (1) and the bearing  
block (7) of the coder (8), by a first jig (3) for mounting the first  
30 bearing (1), and by an assembly of jigs (4) and presses (6) for  
mounting with prestressing the second bearing (1).

35 4. A device according to claim 3, characterised in that the  
station (9) for gluing the shaft (2), the bearings (1) and the bearing  
block (7) of the coder (8) is advantageously formed by a drum (10) for  
mounting and driving the shaft (2) or the coder (8) by means of a chuck  
and by a pipette (11) for distribution of adhesive to the regions to be  
glued, connected to a reservoir for adhesive, rotational drive of the

drum simultaneously triggering delivery of adhesive and being activatable by a foot pedal.

5        5. A device according to claim 3, characterised in that the first  
jig (3) is formed by a hollow cylindrical member provided in its upper  
portion with a shoulder (12) for support of the first bearing (1) and  
enabling seating of the shaft (2), the distance between the support  
surface of the shoulder (12) and the base of the cylindrical member  
being equal to the distance between the support surface of the bearing  
10       (1) and the opposite end of the shaft (2).

6. A device according to claim 3, characterised in that each jig  
(4) working together with a press (6) is formed by a hollow cylindrical  
member, which may be mounted in alignment with the axis of the jack of  
15       the corresponding press by interchangeably fitting it into a  
cylindrical hole (13) in the support (14) for the said press (6), and  
the said hollow member having a closed base (15) for support of the end  
of the shaft (2) and guiding the bearings (1) by their outer rings.

20       7. A device according to any of claims 3 and 6, characterised in  
that each press (6) is formed by a jack, the head (16) of which is  
provided with a hollow cylindrical portion (17) adapted to be fitted  
onto the corresponding end of the shaft (2) for mounting the bearings  
(1), and to engage against the upper bearing, and by a cylindrical  
25       portion (18) of greater diameter, offset with respect to the hollow  
portion (17), and adapted to engage against the support surface of the  
corresponding jig (4), the length of the offset between the support  
surfaces of the portions (17) and (18) corresponding to the driving  
path of the portion (17) in the jig (4) which is necessary to bring  
30       about the prestressing of the spring (5).

8. A coder, obtained by effecting the method according to either  
of claims 1 and 2, by means of the device according to any of claims 3  
to 7, characterised in that it is provided with a shaft (2) mounted  
35       with prestressing in its bearing block by means of bearings (1) loaded  
by a spring (5) acting between their outer rings.

9. A method of mounting shaft bearings, substantially as

described herein with reference to the accompanying drawings.

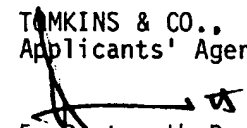
10. A shaft mounted by the method of claim 1, claim 2 or claim 9.

5        11. A device for mounting shaft bearings, substantially as described herein with reference to and as shown in Figures 2 and 3 of the accompanying drawings.

10       12. A coder substantially as described herein with reference to and as shown in Figure 1 of the accompanying drawings.

Dated this the 14th day of November, 1990.

15

BY: TOMKINS & CO.,  
Applicants' Agents,  
(Signed)   
5, Dartmouth Road,  
DUBLIN 6.

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ABSTRACT

A METHOD FOR MOUNTING SHAFT BEARINGS, IN PARTICULAR FOR CODERS, A  
DEVICE FOR EFFECTING THIS METHOD AND CODERS THUS OBTAINED.

5

The present invention relates to a method for mounting shaft  
bearings, in particular for coders, a device for effecting this method  
and coders thus obtained.

10

The method is characterised in that is consists essentially of  
gluing the shaft (2) at the level of the mounting region for the first  
bearing (1), of fitting the said shaft into the inner ring of the said  
first bearing (1) until it butts against the base of a jig (3) for  
supporting the said first bearing (1), of gluing the said shaft (2) at  
15 the level of the mounting region for the second bearing (1), of placing  
it in a jig (4) for assembly of this latter, of putting an intermediate  
prestressing spring (5) in place on the shaft (2), of mounting the  
second bearing (1) on the shaft (2), of bringing the said second  
bearing (1) into its operating position by means of a press (6)  
20 cooperating with the jig (4), then of gluing, on the one hand, the base  
of the bearing block (7) of the coder (8), at the seating level of one  
of the bearings (1), and, on the other hand, the other bearing (1) on  
its outer ring, and, finally, of mounting the shaft (2) with its  
bearings (1) in the said bearing block (7).

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- Figure 2 -

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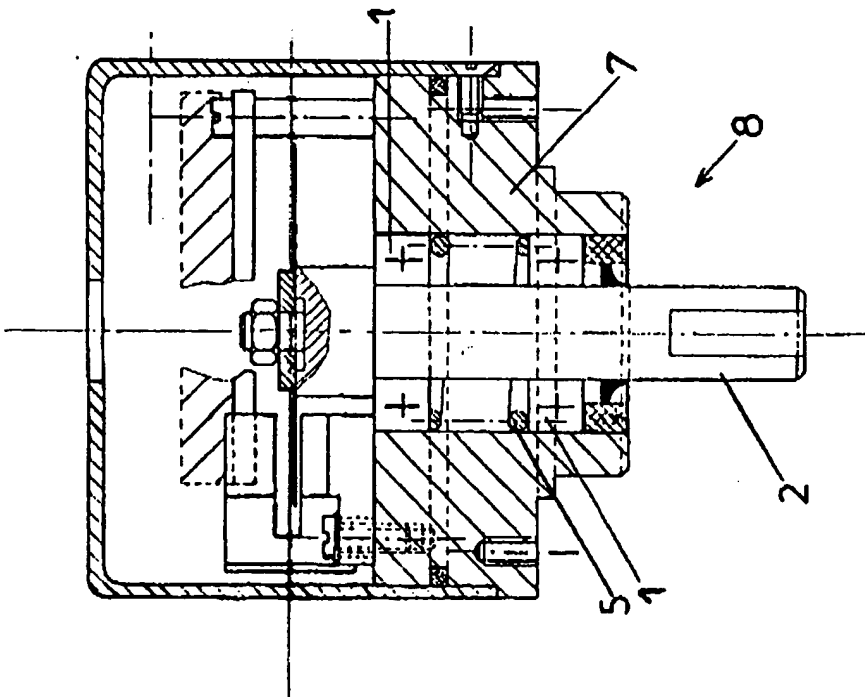


Fig. 1

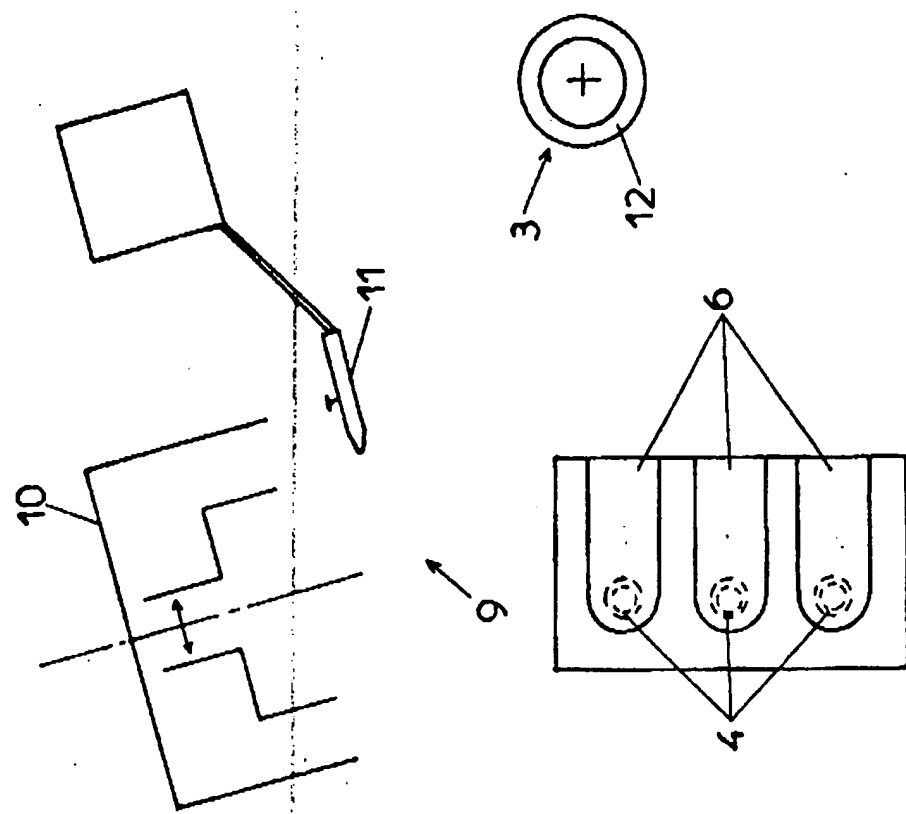


Fig. 2

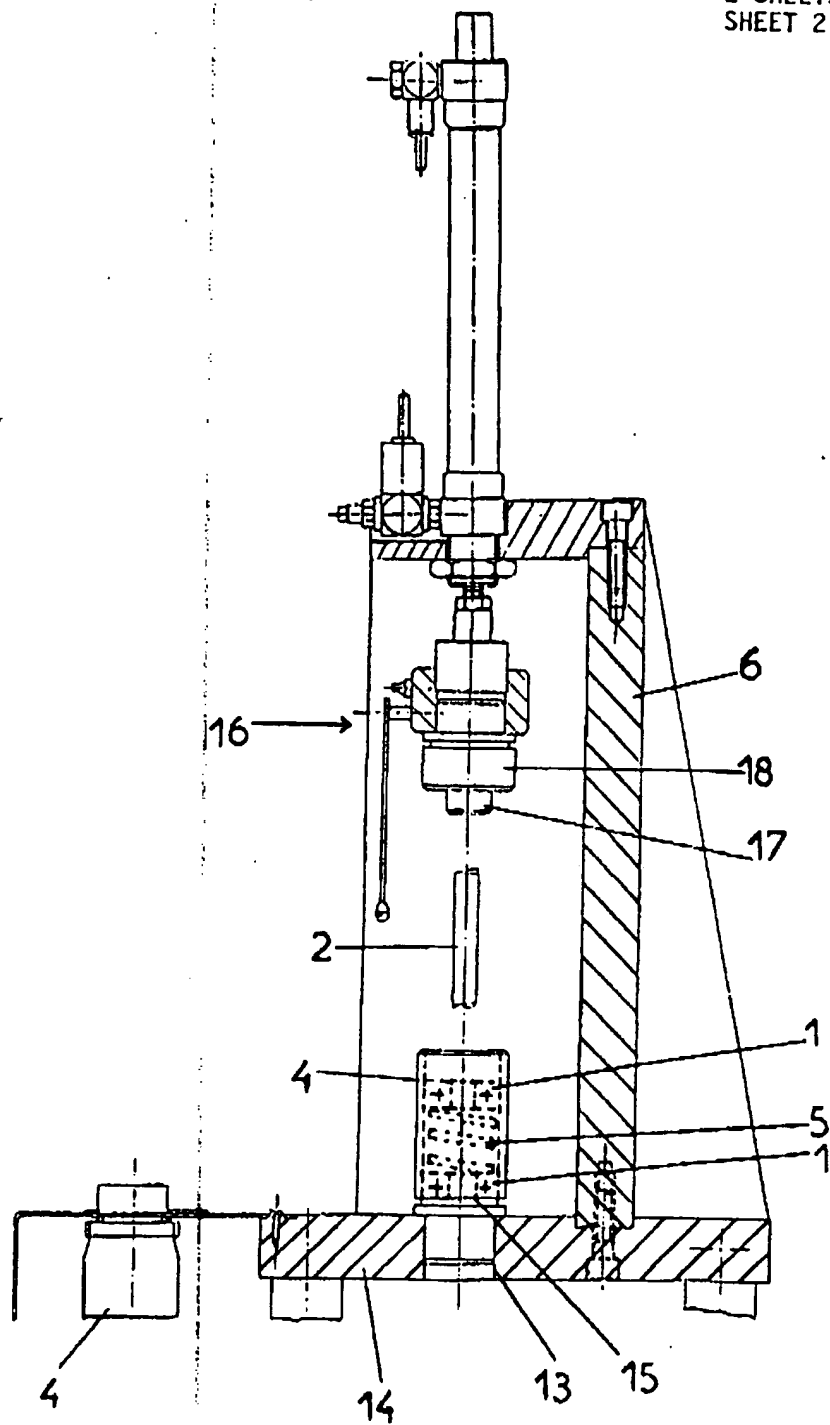


Fig. 3

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